AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method to detect a nucleotide or nucleoside, comprising:

separating a purine or pyrimidine base from a ribose or deoxyribose moiety of the nucleotide or nucleoside;

depositing the separated purine base or pyrimidine base on a surface enhanced Raman spectroscopy (SERS) substrate; and

~~synthesizing a double-strand molecule comprising the separated purine base or pyrimidine base and a single strand target molecule on the SERS substrate; and~~

detecting the separated purine or pyrimidine base using SERS.

2. (Previously Presented) The method of claim 1, wherein the method detects a deoxynucleotide triphosphate.

3. (Previously Presented) The method of claim 2, wherein the method further comprises including the deoxynucleotide triphosphate in a nucleic acid sequencing reaction mixture before separating the purine or pyrimidine base from the purine or pyrimidine moiety.

4. (Previously Presented) The method of claim 1, wherein the purine or pyrimidine base is associated with a Raman label before it is detected by SERS.

5. (Previously Presented) The method of claim 1, wherein the nucleotide or nucleoside comprises a purine base.

6. (Previously Presented) The method of claim 5, wherein the base consists essentially of adenine.

7. (Previously Presented) The method of claim 5, wherein the base consists essentially of guanine.

8. (Previously Presented) The method of claim 1, wherein the surface enhanced Raman spectroscopy is surface enhanced coherent anti-Stokes Raman spectroscopy (SECARS).

9. (Previously Presented) The method of claim 8, wherein the nucleotide or nucleoside comprises a pyrimidine base.

10. (Previously Presented) The method of claim 9, wherein the nucleotide or nucleoside comprises thymine.

11. (Previously Presented) The method of claim 9, wherein the nucleotide or nucleoside comprises uracil.

12. (Previously Presented) The method of claim 9, wherein the nucleotide or nucleoside comprises cytosine.

13. (Currently Amended) The method of claim 1, wherein the separated purine or pyrimidine base ~~single-strand target molecule~~ is deposited on silver nanoparticles.

14. (Currently Amended) The method of claim 13, wherein the separated purine or pyrimidine base ~~target molecule~~ is contacted with an alkali-metal halide salt.

15. (Previously Presented) The method of claim 14, wherein the alkali-metal halide salt is lithium chloride.

16. (Currently Amended) A method to detect a ~~single strand~~ target molecule comprising a purine base or a pyrimidine base, comprising:

obtaining the ~~single strand~~ target molecule;

separating a purine base or pyrimidine base from the target molecule;

depositing the separated purine base or pyrimidine base ~~target molecule~~ on a surface enhanced Raman spectroscopy (SERS) substrate;

~~synthesizing a double-strand molecule comprising a complimentary purine base or pyrimidine base and the single strand target molecule on the SERS substrate;~~ and

detecting Raman scattering from the separated purine base or pyrimidine base ~~double-strand molecule~~ using surface enhanced coherent anti-Stokes Raman spectroscopy (SECARS) to detect ~~a sequence of~~ the ~~single strand~~ target molecule.

17. (Currently Amended) The method of claim 16, wherein the ~~single strand~~ target molecule is isolated from a biological sample.

18. (Currently Amended) The method of claim 16, wherein the ~~single strand~~ target molecule is a nucleotide[[,]] or a nucleoside~~, or a base~~.

19. (Currently Amended) The method of claim 18, wherein the ~~single strand~~ target molecule comprises ~~consists essentially of~~ a pyrimidine base.

20. (Currently Amended) The method of claim 19, wherein the target molecule comprises ~~the base consists essentially of~~ thymine.

21. (Currently Amended) The method of claim 19, wherein the target molecule comprises ~~the base consists essentially of~~ uracil.

22. (Currently Amended) The method of claim 19, wherein the target molecule comprises ~~the base consists essentially of a~~ cytidine.

23. (Currently Amended) The method of claim 16, wherein the ~~single strand~~ target molecule is a nucleotide triphosphate.

24. (Currently Amended) A method to detect identical nucleotides at consecutive positions in a ~~complimentary to a single strand~~ template nucleic acid molecule, comprising:

contacting a known number of copies of the template ~~the single strand template~~ nucleic acid molecule with a reaction mixture comprising a primer, a polymerase, and a known initial concentration of a first nucleotide to form a post-reaction mixture, the primer or the template single strand nucleic acid being immobilized on a surface of the reaction chamber;

~~synthesizing a double strand molecule comprising the first nucleotide and the single strand template nucleic acid;~~

separating a purine or pyrimidine base from a ribose or deoxyribose moiety of the first nucleotide;

depositing the purine or pyrimidine base ~~post reaction mixture~~ on a surface enhanced Raman spectroscopy (SERS) substrate;

detecting ~~a concentration of the first nucleotide using SERS; and~~

~~determining~~ whether ~~one or~~ more than one of the first nucleotide was added to the consecutive target positions. ~~synthesized to the single strand template nucleic acid.~~

25. (Previously Presented) The method of claim 24, wherein the known number of copies of the single strand template nucleic acid molecule is about the same as a known number of first nucleotide molecules in the reaction mixture.

26. (Previously Presented) The method of claim 24, wherein the known number of copies of the single strand template nucleic acid molecule is about one half a known number of first nucleotide molecules in the reaction mixture.

27. (Currently Amended) The method of claim 24, further comprising adding additional first nucleotide to the reaction mixture after [[said]] detecting ~~the concentration of~~ the first nucleotide.

28. (Canceled).

29. (Currently Amended) The method of claim 24, wherein the ~~detecting the concentration of the first nucleotide using~~ SERS detection is surface enhanced coherent anti-Stokes Raman spectroscopy (SECARS).

30. (Previously Presented) The method of claim 24, further comprising repeating said steps of claim 24 with a different nucleotide.

31. (Previously Presented) The method of claim 24, wherein the nucleotide is attached to a Raman label before it is detected by SERS.

32. (Previously Presented) The method of claim 24, wherein an internal control is included in the reaction mixture and detected using SERS.

33. (Previously Presented) The method of claim 32, wherein the SERS signal of the internal control and the nucleotide is compared to determine whether more than one nucleotide was added to the consecutive positions complimentary to the single strand template nucleic acid molecule.

34. (Currently Amended) A method to determine a nucleotide occurrence at a target position of a ~~single strand~~ template nucleic acid molecule, comprising:

contacting a detectable number of ~~the single strand~~ template nucleic acids with a reaction mixture in a reaction chamber, the reaction mixture comprising a primer, a polymerase, and an initial concentration of a first nucleotide, the primer or the single strand template nucleic acid being immobilized on a surface of the reaction chamber;

incubating the reaction mixture to allow binding of the primer to the ~~single strand~~ template nucleic acid and formation of a post-reaction mixture;

~~synthesizing a double strand molecule comprising the first nucleotide and the single strand template nucleic acid;~~

separating a purine or pyrimidine base from a ribose or deoxyribose moiety of the first nucleotide in the post-reaction mixture;

depositing the separated purine or pyrimidine base ~~post reaction mixture, or a component thereof,~~ on a surface enhanced Raman spectroscopy (SERS) substrate; and

detecting a Raman signal from the first nucleotide using SERS, wherein a decrease in the concentration ~~intensity of the Raman signal~~ of the first nucleotide in the post-reaction mixture identifies an extension reaction product, thereby identifying the nucleotide occurrence at the target position.

35. (Previously Presented) The method of claim 34, further comprising repeating the steps of claim 34 with a different nucleotide until the nucleotide occurrence is identified.

36. (Previously Presented) The method of claim 35, further comprising washing the SERS substrate.

37. (Previously Presented) The method of claim 34, wherein the incubation time is about 1 second to 10 minutes.

38. (Previously Presented) The method of claim 34, wherein the reaction chamber is less than 100 nm in at least one dimension.

39. (Previously Presented) The method of claim 34, wherein a pre-reaction SERS analysis is performed on the first nucleotide before it contacts the single strand template nucleic acid molecule.

40. (Canceled).

41. (Previously Presented) The method of claim 34, wherein the method is performed twice for the target position, using dATP and dGTP one at a time as the first nucleotide and a second nucleotide.

42. (Previously Presented) The method of claim 41, wherein the complementary strand of the template nucleic acid molecule is immobilized in a second reaction chamber and the method is performed an additional two times, again using dATP and dGTP one at a time as the first nucleotide and the second nucleotide.

43. (Previously Presented) The method of claim 34, wherein an internal control is included in the reaction mixture and detected using SERS.

44. (Previously Presented) The method of claim 43, wherein the SERS signal of the internal control and the nucleotide is compared to identify the nucleotide occurrence at the target position.

45. (Canceled).

46. (Canceled).

47. (Previously Presented) The method of claim 24, wherein the detecting is by monitoring a differential concentration of a purine base or pyrimidine base before and after the synthesizing of the double-strand molecule.

48. (Previously Presented) The method of claim 34, wherein the detecting is by monitoring a differential concentration of a purine base or pyrimidine base before and after the synthesizing of the double-strand molecule.

49. (New) The method of claim 1, further comprising synthesizing a double strand nucleic acid comprising a nucleotide prior to separating the purine or pyrimidine base from the nucleotide.

50. (New) The method of claim 49, wherein the surface enhanced Raman spectroscopy is surface enhanced coherent anti-Stokes Raman spectroscopy (SECARS).